

# Autonomous Airport Operations for Safe and Efficient Use of Airports, Phase I

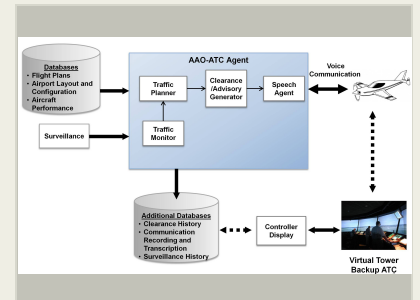
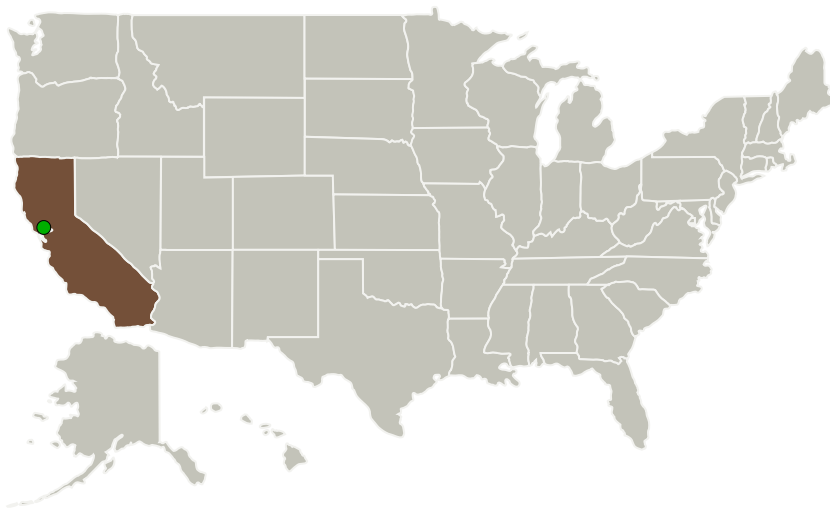
Completed Technology Project (2015 - 2015)



## Project Introduction

The concepts of Virtual Towers and Autonomous Airport Operations emerged as cost-effective options in early conceptualization of the Next-Generation Air Transportation System (NextGen) for relieving traffic demand at major airports by providing control tower services at nearby uncontrolled airports. These concepts have the benefit of saving the tower construction cost and the cost for otherwise staffing the towers with a full cadre of controllers. More recently, the threat of sequestration forced the FAA to announce closure of 149 airport towers; though the closure plan was rescinded, these concepts again appear as viable alternatives for providing control-tower services at reduced costs. Virtual Towers and Autonomous Airport Operations are in fact related concepts. On one hand, Virtual Towers depend on automation to allow a small crew of controllers to manage traffic at multiple airports, and the increase in automation moves the concept towards Autonomous Airport Operations as automation becomes more capable. On the other hand, Autonomous Airport Operations should have controllers available as a fall-back option in a Virtual Tower environment to ensure safety when abnormal conditions emerge. The proposed research seeks to develop practical concepts for Autonomous Airport Operations, and apply state-of-the-art automation technologies to enable such operations. The automation technologies include a computer-based ATC agent that can monitor and plan traffic movement, issue clearances, and communicate with the pilots over the radio using advanced speech processing technologies. In addition, low-cost surveillance systems based on machine vision will be explored to provide the necessary traffic information around the airport and on the airport surface.

## Primary U.S. Work Locations and Key Partners



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| Organizations Performing Work | Role                    | Type   | Location                  |
|-------------------------------|-------------------------|--|---------------------------|
| Optimal Synthesis, Inc.       | Lead Organization       | Industry<br>Small Disadvantaged Business (SDB) | Los Altos, California     |
| ● Ames Research Center(ARC)   | Supporting Organization | NASA Center                                    | Moffett Field, California |

## Primary U.S. Work Locations

California

## Project Transitions

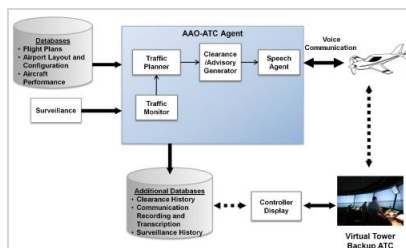
**June 2015:** Project Start**December 2015:** Closed out

**Closeout Summary:** Autonomous Airport Operations for Safe and Efficient Use of Airports, Phase I Project Image

### Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138840>)

## Images



### Briefing Chart Image

Autonomous Airport Operations for Safe and Efficient Use of Airports, Phase I

(<https://techport.nasa.gov/image/126809>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Optimal Synthesis, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

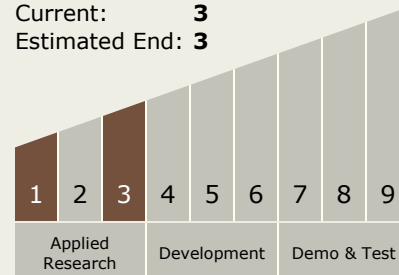
Carlos Torrez

### Principal Investigator:

Victor H Cheng

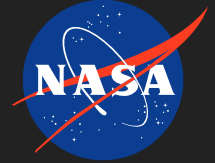
## Technology Maturity (TRL)

Start: **1**  
Current: **3**  
Estimated End: **3**



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## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.3 Aero Propulsion
    - └ TX01.3.1 Integrated Systems and Ancillary Technologies

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System